

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Eurycea naufragia*

COMMON NAME: Georgetown salamander

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: October 2005

STATUS/ACTION:

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition requesting a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

☐ Listing priority change

Former LP: ☐

New LP: ____

Date when the species first became a Candidate (as currently defined): October 30, 2001

____ Candidate removal: Former LP: ____

____ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

____ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

____ F – Range is no longer a U.S. territory.

____ I – Insufficient information exists on biological vulnerability and threats to support listing.

____ M – Taxon mistakenly included in past notice of review.

____ N – Taxon does not meet the Act's definition of "species."

____ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Amphibian, Plethodontidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Texas

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Williamson County, Texas

LAND OWNERSHIP: All of the known locations for the Georgetown salamander are under private ownership.

LEAD REGION CONTACT: Susan Jacobsen, 505-248-6641

LEAD FIELD OFFICE CONTACT: Paige Najvar, Austin Ecological Services Field Office, 512-490-0057

BIOLOGICAL INFORMATION

Species Description: The Georgetown salamander is entirely aquatic and neotenic, meaning it does not metamorphose into a terrestrial adult. Adults are approximately 2 inches long. It is characterized by a broad, relatively short head with three pairs of bright-red gills on each side behind the jaws, a rounded and short snout, and large eyes with a gold iris. The upper body is generally greyish with varying patterns of melanophores and iridophores, while the underside is pale and translucent. The tail tends to be long with poorly-developed dorsal and ventral fins that are golden-yellow at the base, cream-colored to translucent toward the outer margin, and mottled with melanophores and iridophores. Unlike the Jollyville Plateau salamander (*Eurycea tonkawae*), the Georgetown salamander has a distinct dark border along the lateral margins of the tail fin (Chippindale et al. 2000).

Taxonomy: A description of the Georgetown salamander was published by Chippindale et al. (2000). The three known salamander species that occur in the Northern Segment of the Edwards Aquifer have very similar external morphology. Because of this, they were previously believed to be the same species; however, molecular evidence strongly suggests that there is a high level of divergence between the three groups (Price et al. 1994, Chippindale et al. 2000). All three of these species, including the Georgetown salamander belong to the species *Eurycea* within the Tribe Hemidactyliini. Tribe Hemidactyliini are characterized from other Tribes in Family Plethodontidae as having aquatic larvae. Plethodontid salamanders comprise the largest family of salamanders within the Order Caudata and are characterized by an absence of lungs (Petranka 1998).

Habitat/Distribution: The Georgetown salamander is known from springs along five tributaries (South, Middle, and North forks; Cowan Creek; and Berry Creek) to the San Gabriel River and in one cave in the City of Georgetown, Williamson County, Texas.

Population Estimates/Status: Because this species spends a portion of its life underground and the technology to safely and reliably mark salamanders for individual recognition has not been developed, population estimates are not possible at this time. Chippindale et al. (2000) stated that they believe there are undiscovered localities of the Georgetown salamander within the San Gabriel watershed. This hypothesis has not been verified.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range. Primary threats include the chronic and catastrophic degradation of water quality and loss of adequate springflow at the spring sites that support the Georgetown salamander. The hydrologic connections between groundwater and surface water of the Northern Segment of the Edwards Aquifer are the ecological basis for maintaining adequate water quality for organisms that depend on the aquifer for survival, such as the Georgetown salamander. Urbanization within the central Texas region is rapidly expanding. Based on population projections from the Texas State Data Center (2000), the population of Williamson County in 2030 is projected to be 7 times the size of the 1990 population (projected increase from 139,551 to 989,139). Georgetown is the fastest growing city in Williamson County, and Williamson County is the second fastest growing non-urban county in the United States (Georgetown Chamber of Commerce 2000).

Urbanization can dramatically alter the normal hydrologic regime and water quality of an area. Increases in impervious cover resulting from urbanization have been shown to cause measurable water quality degradation (Klein 1979, Bannerman et al. 1993, Center for Watershed Protection 2003). Impervious cover in a stream's watershed causes streamflow to shift from predominantly baseflow, which is derived from natural filtration processes and discharges from local groundwater supplies, to predominantly stormwater runoff. Stormflows carry pollutants and contaminants into stream systems (Klein 1979, Bannerman et al. 1993, Schueler 1994, Barrett and Charbeneau 1996, Dartiguenave et al. 1997, Center for Watershed Protection 2003). With increasing stormflows, the amount of baseflow available to sustain water supplies during drought cycles is diminished and the frequency and severity of flooding increases. The increased

quantity and velocity of runoff increases erosion and streambank destabilization, which in turn leads to increased sediment loadings, channel widening, and detrimental changes in the morphology and aquatic ecology of the affected stream system (Hammer 1972, Booth 1990, Booth and Reinelt 1993, Scheuler 1994, Dartiguenave et al. 1997, Pizzuto et al. 2000, Center for Watershed Protection 2003).

Even at relatively low levels of impervious cover, "profound and often irreversible impacts to the hydrology, morphology, water quality, habitat, and biodiversity of streams" can occur (Schueler 1994). Both nationally and locally, consistent relationships between impervious cover and water quality degradation have been documented. In a study of pollutant loads from various land use areas in Austin, stormwater runoff pollutant loads were found to increase with increasing impervious cover. This study also found that pollutant loading rates of the more urbanized watersheds were higher than those of the small suburban watersheds (City of Austin 1990). Soeur et al. (1995) determined that stormwater pollution loadings were correlated with development intensity in Austin.

Increases in impervious cover exceeding 10 percent are associated with measurable water quality degradation, loss of sensitive aquatic organisms, reduction in stream biodiversity, stream warming, and channel instability within a watershed (Schueler 1994). Stream aquatic life problems such as loss of species diversity, malformations, and death have been identified in watersheds having impervious cover of at least 12 percent, with severe problems in watersheds with impervious cover greater than 30 percent. Generally, stream quality impairment can be prevented if watershed imperviousness does not exceed 15 percent and for more sensitive stream ecosystems watershed imperviousness should not exceed 10 percent (Klein 1979).

Chippindale et al. (2000) stated that populations of Georgetown salamanders in the City of Georgetown are "on the brink of extinction." Populations along Cowan Creek lie within the Sun City Georgetown retirement community, designed to accommodate 9,000 homes. Salamander sites along the Middle Fork of the San Gabriel River are near and downstream of a large quarry. Chippindale et al. (2000) did not believe the quarry operations would jeopardize recharge or springflow; however, the current status of these populations is unknown.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Not known to be a factor threatening the Georgetown salamander.

C. Disease or predation. Not known to be a factor threatening the Georgetown salamander.

D. The inadequacy of existing regulatory mechanisms. Controls of nonpoint source pollution in the watershed are implemented through the Edwards Rules (water quality protection measures for the recharge and contributing zones of the Edwards Aquifer), which were adopted by the Texas Commission on Environmental Quality (TCEQ), formerly the Texas Natural Resources Conservation Commission (TNRCC), in 1995 and 1997. To date, no comprehensive study has been conducted to evaluate the effectiveness of existing state and local regulations in protecting water quality and the aquatic organisms that depend on spring discharges from the Edwards Aquifer for survival. In addition, Chapter 245 of the Texas Local Government Code permits

“grandfathering” of state regulations. Grandfathering allows developments to be exempted from new requirements for water quality controls and impervious cover limits, providing that the developments were planned prior to the implementation of such regulations. However, these developments are still obligated to comply with regulations that were applicable at the time when project applications for development were first filed. The potential impact of the grandfathering statute as enacted by the state of Texas has not been examined with respect to existing regulations that protect water quality in the Edwards Aquifer region.

E. Other natural or manmade factors affecting its continued existence. The Georgetown salamander has a very limited distribution and may be highly sensitive to water quality and quantity degradation. Research indicates that amphibians, particularly their eggs and larvae, are sensitive to many pollutants, such as heavy metals; certain insecticides, particularly cyclodienes (endosulfan, endrin, toxaphene, and dieldrin), and certain organophosphates (parathion, malathion); nitrite; salts; and petroleum hydrocarbons (Harfenist et al. 1989). Because of their semipermeable skin, the development of their eggs and larvae in water, and their position in the food web, amphibians can be exposed to waterborne and airborne pollutants in their breeding and foraging habitats. Toxic effects to amphibians from pollutants may be either lethal or sublethal, including morphological and developmental aberrations, lowered reproduction and survival, and changes in behavior and certain biochemical processes. Since the salamander is fully aquatic, there is no possibility for escape from contamination or other threats to its habitat. Crustaceans, particularly amphipods, on which the salamander feeds are especially sensitive to water pollution (Mayer and Ellersieck 1986; Phipps et al. 1995; Burton and Ingersoll 1994).

CONSERVATION MEASURES PLANNED OR IMPLEMENTED: The TCEQ has recently developed voluntary water quality protection measures for development in the Edwards Aquifer region of Texas. In February 2005, the U.S. Fish and Wildlife Service (Service) concurred that these measures, if implemented, would protect several aquatic species from take, including the Georgetown salamander, which would otherwise occur due to water quality degradation resulting from development in the Edwards Aquifer region. However, it should be noted that as a non-listed species, the take prohibitions do not apply to this species. It is not known how many project planners will choose to follow the voluntary measures. The Service is also committed to working with a variety of groups that are involved in monitoring water quality and biological resources within the Edwards Aquifer region. These groups are willing to share the results of their monitoring to be used for trend analyses. If analysis of this monitoring information indicates water quality degradation is occurring, then TCEQ and the Service will meet to evaluate the causes and, if necessary, take additional actions to ensure the protection of the aquatic species that depend on the Edwards Aquifer for survival.

The Williamson County Conservation Foundation (Foundation), a non-profit organization established by Williamson County in 2002, is currently working to find ways to conserve endangered species and other unlisted species of concern in Williamson County, Texas. This organization held a Georgetown salamander workshop in November 2003 in an effort to bring together landowners, ranchers, farmers, developers, local and state officials, Federal agencies, and biologists to discuss information currently known about the salamander and to educate the public on the threats faced by this species.

The Foundation was awarded a section 6 grant to purchase an easement on part of Cobb Cavern. Although the spring where salamanders are located will not be included in the easement, a portion of the contributing watershed for this spring will be. For this reason, some benefits to the salamander are expected. In addition, Williamson County is negotiating to acquire a conservation easement on Cobb Springs (a known location of the Georgetown salamander) and approximately 100 surrounding acres. The Foundation is also trying to procure funds to purchase a conservation easement on Russell Park Spring (another known location of the Georgetown salamander). With the help of another section 6 grant, the Foundation continues to actively develop a regional habitat conservation plan (HCP) to obtain a section 10(a)(1)(B) permit for incidental take of Federally-listed endangered species in Williamson County, Texas. Although the Georgetown salamander is not currently listed, the Foundation has plans to include the Georgetown salamander in their HCP. This may benefit the salamander through the implementation of conservation measures carried out as part of the HCP.

SUMMARY OF THREATS: The primary threats facing the Georgetown salamander are the degradation of the quality and quantity of water that feeds the springs that support this species as a result of urban expansion over the watershed. The restricted range of the salamander makes it vulnerable to both acute and chronic groundwater contamination. The salamander is also vulnerable to catastrophic hazardous materials spills, increased water withdrawals from the Northern Segment of the Edwards Aquifer, and impacts to its surface habitat.

For species that are being removed from candidate status:

___ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES: The Service recommends developing and implementing comprehensive regional plans to address water quality and quantity threats. A plan to protect or enhance water quality should include measures for projects constructed over contributing and recharge zones of the Northern Segment of the Edwards Aquifer. Such measures should include impervious cover limits, buffer zones for streams and other sensitive environmental features, low-impact developments, structural water quality controls and other strategies to reduce pollutant loads. Land preservation through acquisition, conservation easements, or deed restrictions also can provide permanent protection for water quality and quantity. Programs should be developed to reduce pollutant loading from already existing development and other potential sources of pollutants such as golf courses and transportation infrastructure. Partnerships should be formed with the landowners of the spring sites and efforts should be made to protect the surface habitat of the salamander. The Barton Springs Salamander Recovery Plan (U.S. Fish and Wildlife Service 2005) outlines conservation measures in more detail. The measures set forth in this recovery plan were developed to protect another aquatic species in the Barton Springs Segment of the Edwards Aquifer, but many of these could be applied to the Georgetown salamander as well.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2*
	Non-imminent	Subspecies/population	3
		Monotypic genus	4
		Species	5
Moderate to Low	Imminent	Subspecies/population	6
		Monotypic genus	7
		Species	8
	Non-imminent	Subspecies/population	9
		Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: Limited distribution of this species makes it extremely vulnerable to extinction from degradation of water quality and decreased water quantity.

Imminence: This species occurs in one of the most rapidly growing regions in the United States, making the loss of spring flow and degradation of water quality an imminent threat of total habitat loss.

 X Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? No. No information has been received that would indicate threats are likely to extirpate this species before a normal listing process could be conducted.

DESCRIPTION OF MONITORING: Because the known locations are on private property, access to these sites is difficult. We checked with two people likely to know if any on-the-ground monitoring had been done in 2005. Although monitoring of the salamander did not occur in regular intervals, Texas Parks and Wildlife Department (TPWD) and representatives from an environmental consulting firm have visited two known Georgetown salamander sites (Cobb Springs and a spring on Russell Park Estates) in Williamson County during 2005 and confirmed the presence of this species at both sites (Andy Price, TPWD, pers. comm. 2005; Alan Glen, Smith, Robertson, Elliot, and Glen, pers. comm. 2005). The Service also made a site visit to Cobb Springs. During this visit, salamanders were observed.

COORDINATION WITH STATES:

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: The Service coordinated with TPWD, who agreed that the Georgetown salamander should remain a candidate for listing.

Indicate which State(s) did not provide any information or comments: NA

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Rich McDonald 11/17/2005
Acting Regional Director, Fish and Wildlife Service Date



Concur: _____ August 23, 2006
Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: October 7, 2005

Conducted by: Paige A. Najvar, Austin Ecological Services Field Office